

NOTICE OF CONSTRUCTION AND APPLICATION FOR APPROVAL

Incomplete applications delay Agency review, so please fill out your application thoroughly. Instructions for filling out the application are available on the [NOC Permit Application Instructions](#) webpage.

GENERAL EQUIPMENT FORM		FORM P	
AGENCY USE ONLY		Date: 2/27/09	Reg No.: 14107 NOC No.: 10024
Type of business: (check) <input type="checkbox"/> new <input checked="" type="checkbox"/> existing	Status of equipment (check): <input type="checkbox"/> new <input type="checkbox"/> altered <input checked="" type="checkbox"/> existing <input type="checkbox"/> relocation	Applicant Name & Mailing Address: Brandon Byhre - Spectrum Glass Company 24105 Sno-Woodinville Rd Woodinville WA, 98072 Phone No.: 425-483-6699 Fax No.: 425-483-9007 Email Address: brandonbyhre@spectrumglass.com	
Company (or owner) name & mailing address: Spectrum Glass Company 24105 Sno-Woodinville Rd. Woodinville WA, 98072		Installation address (Include city & zip code): 24105 Sno-Woodinville Rd. Woodinville WA, 98072	
Nature of Business / Type of Process: Furnace Size Reduction			
PROCESS EQUIPMENT AND CONTROL EQUIPMENT			
Process Equipment		Air Pollution Control Equipment	
# Units	Equipment Type	# Units	Equipment Type
1	Electric melting Furnace		
<input type="checkbox"/> Attach a process flow diagram		<input type="checkbox"/> Attach a project description	
PREPARER'S CERTIFICATION STATEMENT			
I, the undersigned, certify that the information contained in this application and the accompanying forms, plans, and supplemental data described herein is to the best of my knowledge, accurate and complete.			
Signature: Brandon Byhre		Date: 2/24/2009	
Type or print name: Brandon Byhre	Title: Glass Technology Manager	Phone: 425-483-6699	
Prepared by (signature and title): Brandon Byhre Glass Technology Manager			

PAID  
AMOUNT \$1,000.00  
CK. NO. 75352  
RCPT. NO. 87188

Your application will not be processed unless you mail a \$1,000 filing fee payment along with this application. Additional fees may apply after application review. An Environmental Checklist form and additional equipment specific forms may also be needed. These forms are available on the Agency's [Regulatory Forms](#) webpage. See the [NOC Permit Application Instructions](#) webpage for instructions on filling out the permit application. If you want to pay by credit card, please call Andrea King at (206) 689-4014.

Dear Mr. Renninger,

We would like to modify one of our existing electric melt furnaces. I would like to find out if this falls under a B10 exemption. If not, can we have a new order of approval that encompasses both furnace sizes allowing us to size the furnace at any given time to produce product to fulfill sales needs at that time. The current furnace produces ~40,000 lbs of glass per day and ~13,400,000 per year when at full production. We would like to replace this furnace with a smaller electric melt furnace (Same design as an existing electric melt furnace we currently have). The new/smaller furnace will melt ~25,000 lbs of glass per day and ~8,375,000 per year when at full production.

Our current furnace has been operating 20 hrs/day, 4 days/week, and 48 weeks/year. On the current schedule the furnace can lose its batch pile over the three idle days potentially creating emissions. The new/smaller furnace will operate 9.5 hrs/day, 7 days/week, and 48 weeks/year. This will allow us to keep a batch pile on the molten surface at all times minimizing emissions.

We are estimating this furnace to be resized and start production in January of 2010. The raw materials to be charged into this furnace and the charging rate of each material are listed below.

<u>Chemical</u>	<u>lbs/can</u>	<u>cans/hr charged</u>	<u>Charging Rate lbs/hr</u>
Sand	2680	0.5	1340
Soda Ash	951	0.5	475.5
Limestone	580	0.5	290
Nepheline Syanite	180	0.5	90
Potassium Aluminum Fluoride	102	0.5	51
Borax	85	0.5	42.5
Sodium Nitrate	15	0.5	7.5
Sodium Sulfate	12	0.5	6
Carbocite	0.5	0.5	0.25

The current furnace does not have any Particulate Emission Controls. The new/smaller downsized furnace will not have any Particulate Emission Controls. The existing ducting and Stack of the current furnace will not be changed. The current furnace does not have any Sulfur Dioxide Emission Controls. The new/smaller downsized furnace will not have any Sulfur Dioxide Emission Controls either.

The height of the top of the stack above ground level is 40' 4".

The stack diameter is 4'.

The exhaust flow rate @ 600 rpm, 48,000 cfm, 4" static.

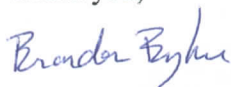
The exhaust flow rate @ 600 rpm, 20,000 cfm, 9" static.

The exhaust temperature leaving the stack is 258 °F.

The distance from the stack to the nearest property line is 75' 5".

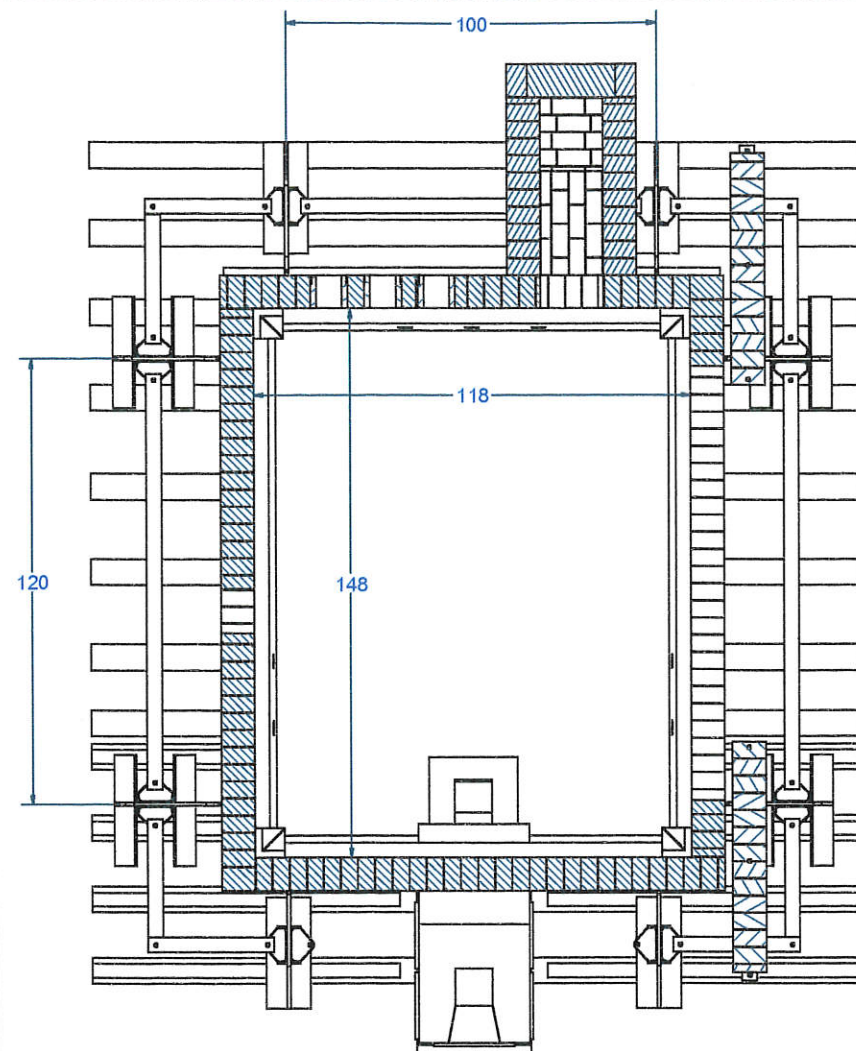
The height maximum height of the building is 51'. The maximum length of the building is 350'. The maximum width of the building is 320'.

Thank you,

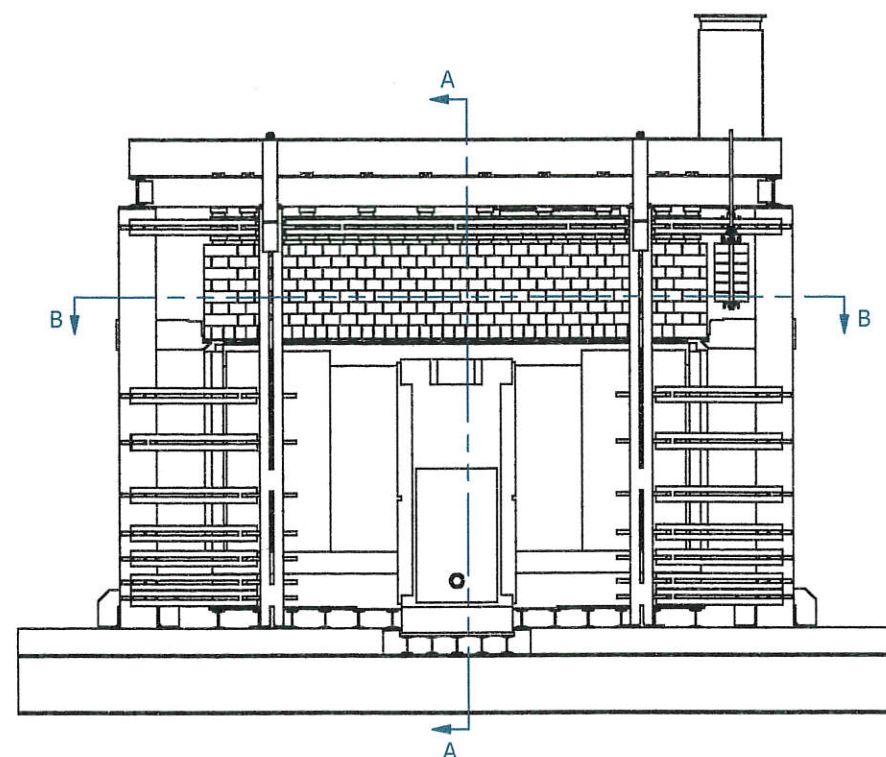


Brandon Byhre





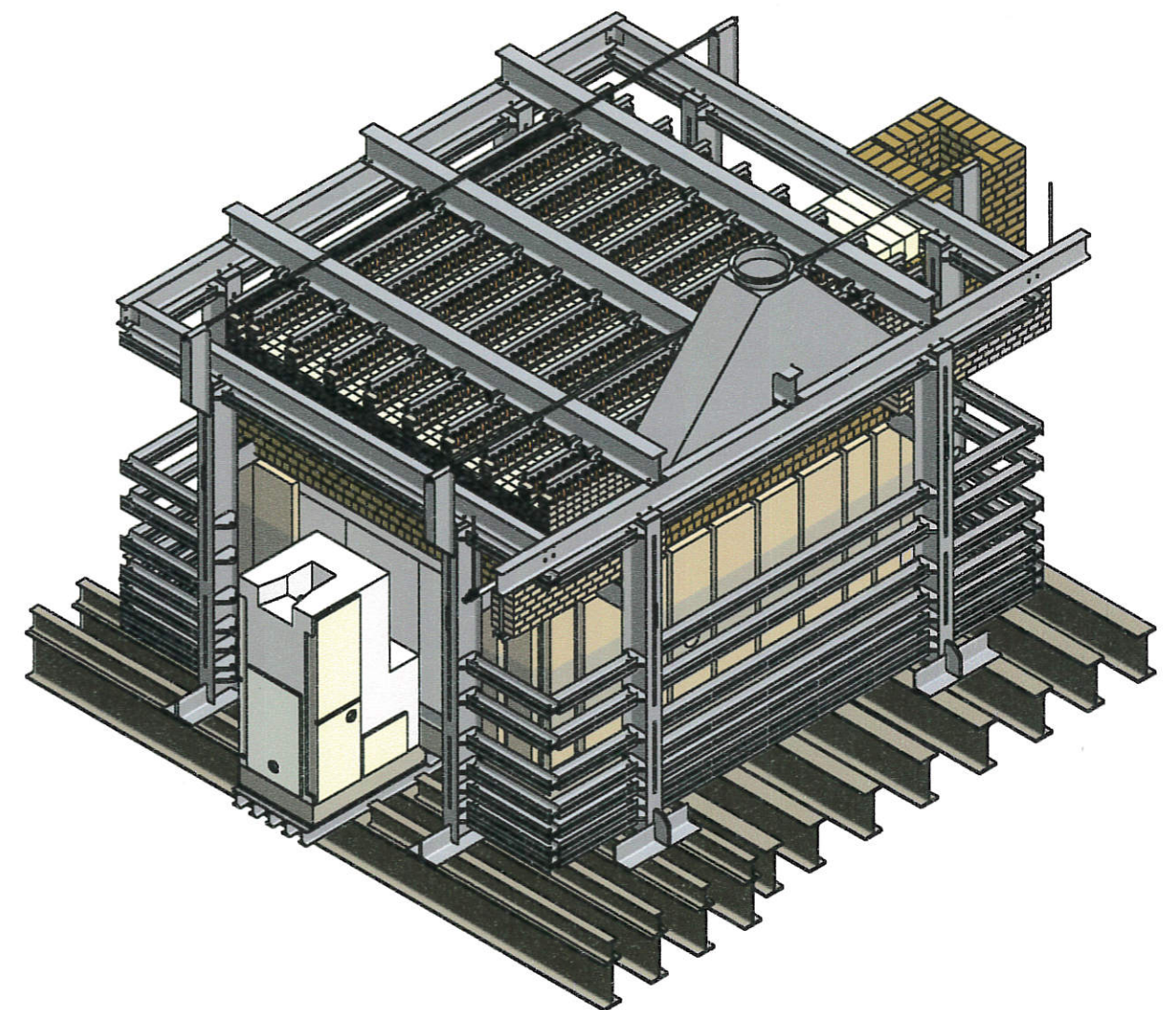
SECTION B-B



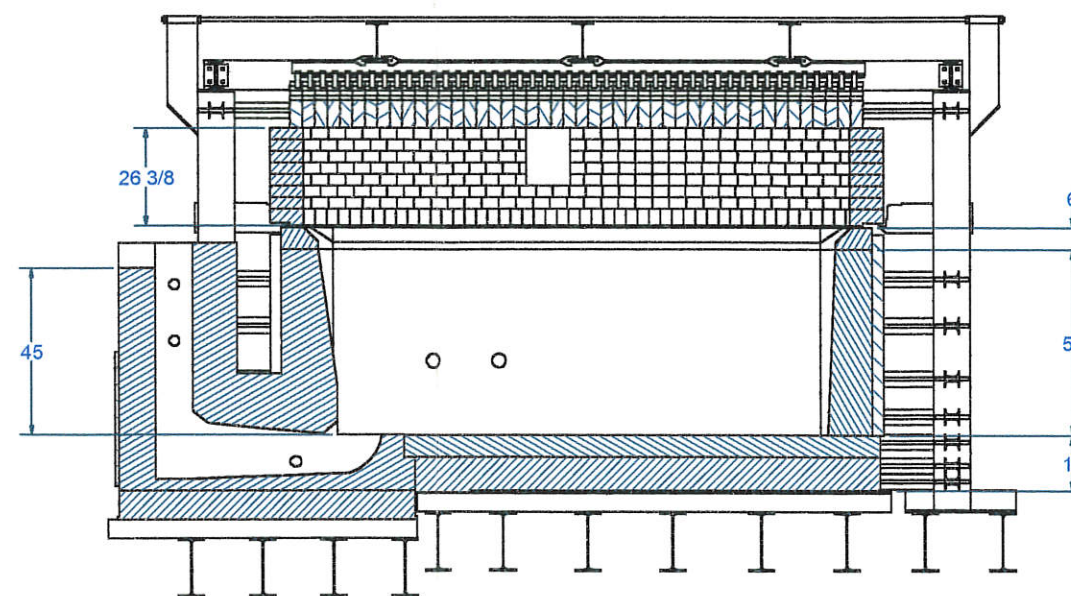
SECTION A-A

Current Furnace Size

PRELIMINARY  
DRAWING



FURNACE #1



THIS DRAWING AND  
RELEVANT INFORMATION  
MUST NOT BE USED IN  
ANY WAY CONTRARY TO  
THE INTEREST OF:



**Spectrum Glass Co.**

DIMENSIONS: INCHES UNLESS SPECIFIED.  
OTHERWISE:  
DECIMALS: XX ± .01 ANGLES: 0°30'  
XXX ± .005 FRACTIONS: ± 1/32  
FINISH: NONE

**F#1 CONVERSION TO F#3**

DESIGNER:  
Hugo Muñoz

DATE:  
1/21/2009

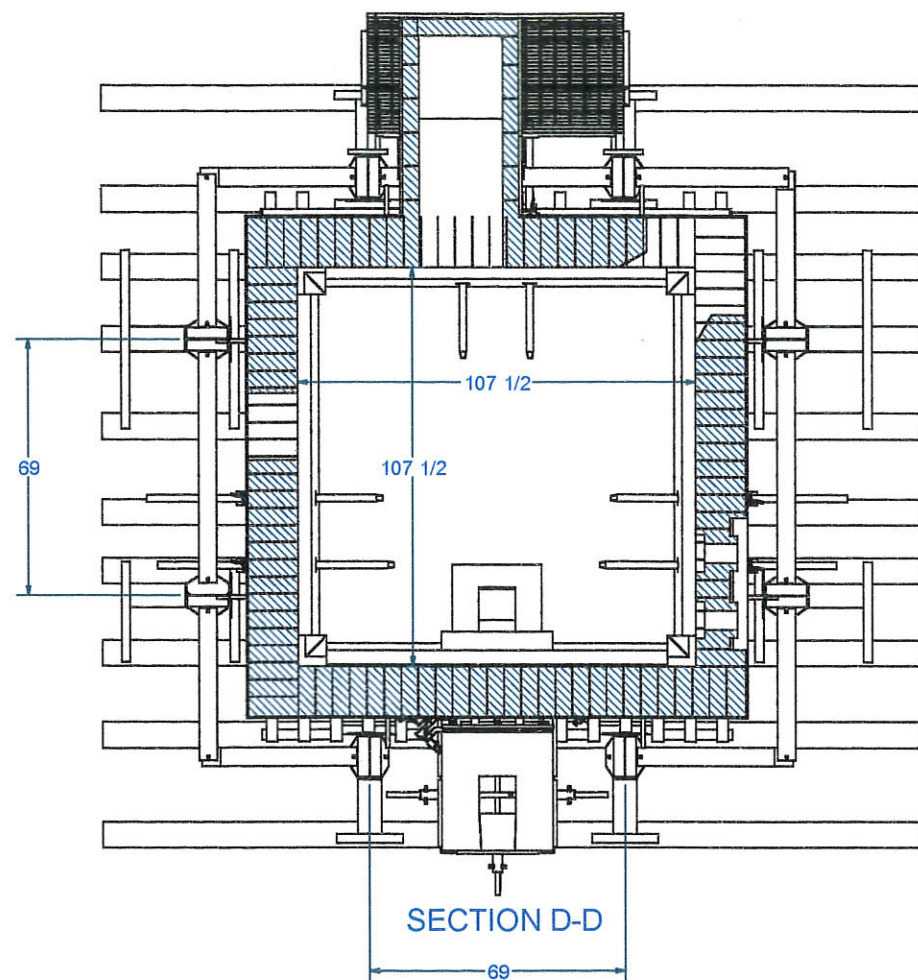
SCALE:  
DWG#

**F1-SK1**

SHEET  
1 OF 2

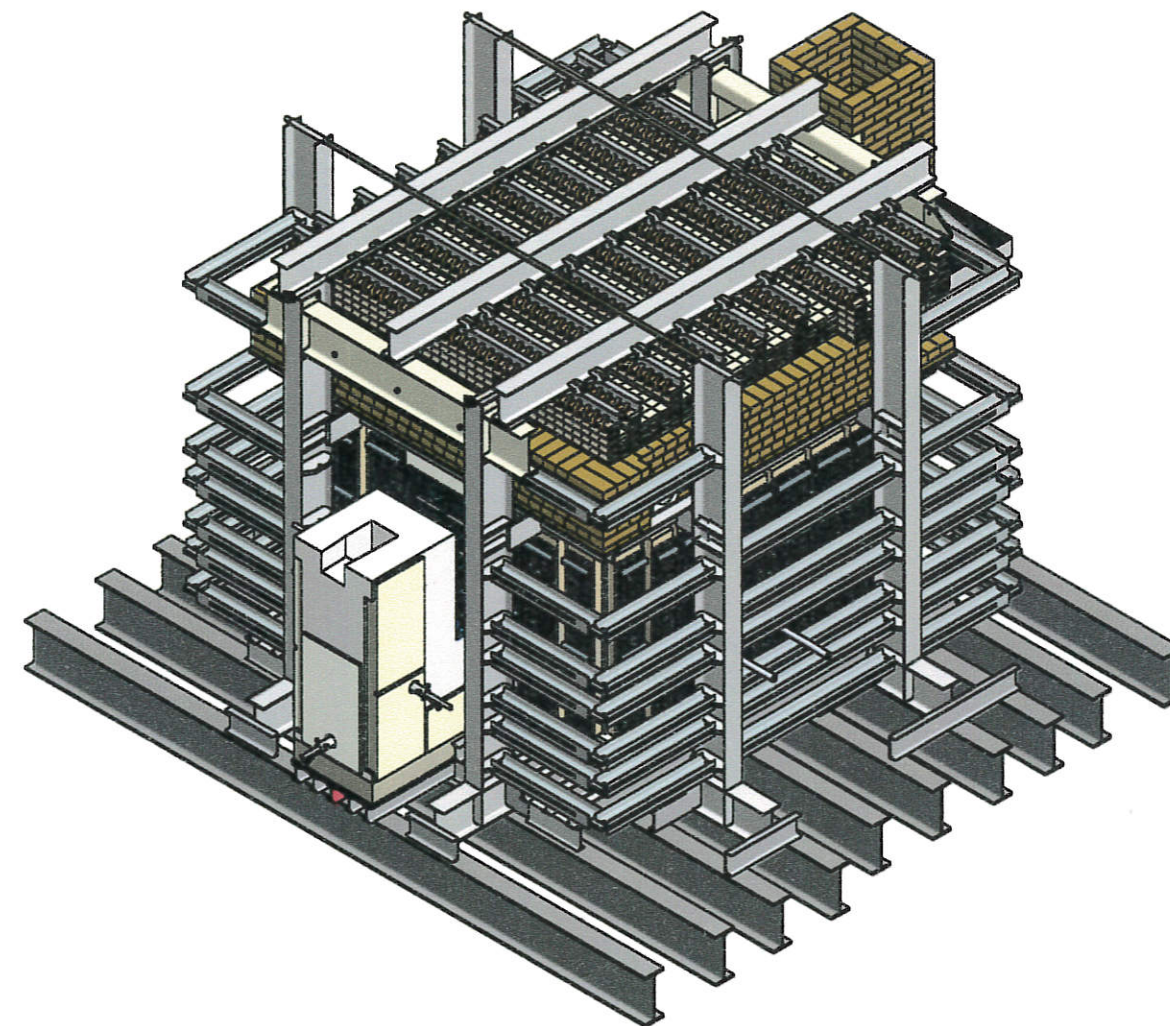
REVISION



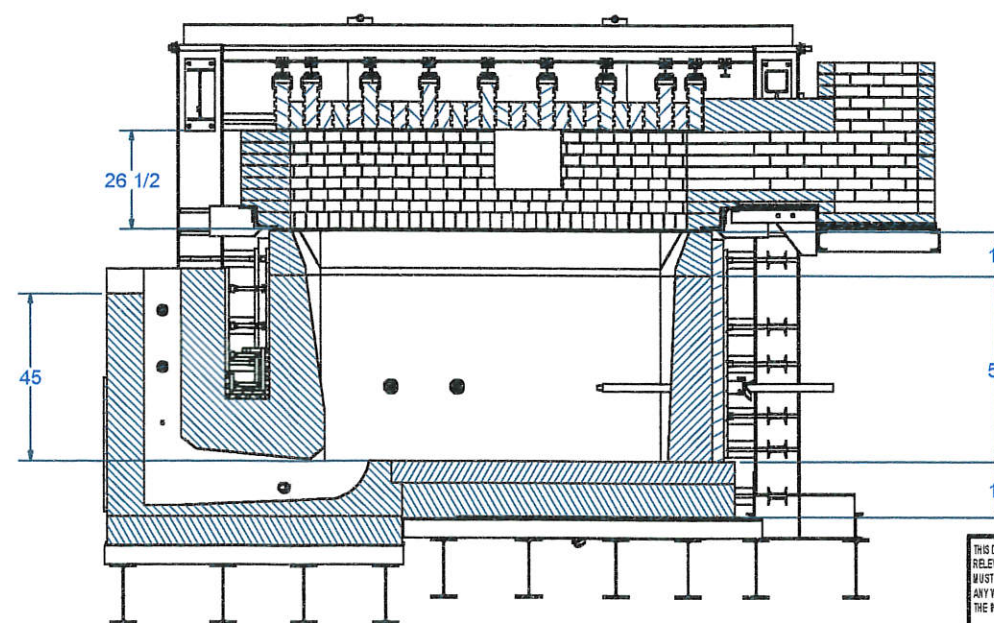
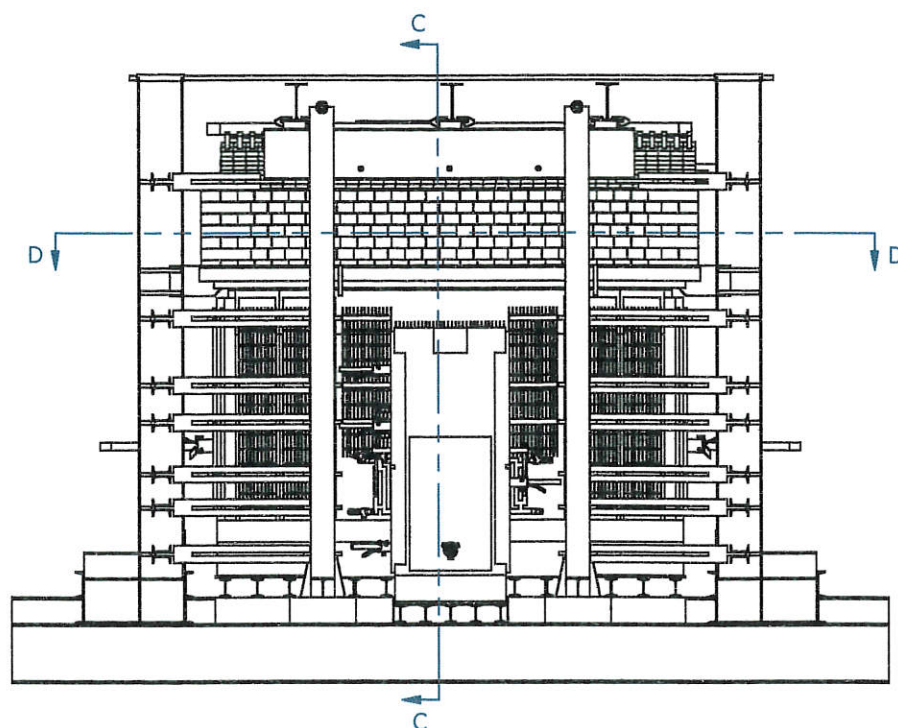


Proposed Furnace Size

PRELIMINARY  
DRAWING



FURNACE #3



SECTION C-C

THIS DRAWING AND  
RELEVANT INFORMATION  
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ANY WAY CONTRARY TO  
THE INTEREST OF



**Spectrum Glass Co.**

DIMENSIONS: INCHES UNLESS SPECIFIED  
OTHERWISE  
DECIMALS: XX ± 0.01 ANGLES: 0/30  
XXX ± 0.05 FRACTIONS: ± 1/32  
FINISH: NONE

**F#1 CONVERSION TO F#3**

DESIGNER:  
Hugo Muñoz

DATE:  
1/21/2009

SCALE:  
DWG#

**F1-SK1**

SHEET  
2 OF 2

REVISION



After the melting and refining, the glass melt flows to the **forehearth**, where the glass is then transferred to the forming process. The forehearth cools the molten glass to a working temperature for forming (typically from 2000°F - 2100°F), removes temperature gradients, and provides the means to transfer the molten glass to forming operations. The forehearth consists of an insulated refractory channel and is equipped with burners and an air cooling system on both sides (see Figure 4-2). It can be heated with natural gas or electricity. A natural-gas heated forehearth reheats the cooler surface of the glass using radiant heat transfer, which also serves to equalize temperature gradients. Electrically-heated forehearths use submerged electrodes that heat the glass through conduction and convection.

The length of the forehearth is based on requirements specific to the individual product and the desired heat loss. Control of the glass melt through the forehearth is critical for forming, and the process is highly automated. Controls typically include automated setups, cooling air adjustments and precise zone temperature controls.

### ***Continuous Furnaces Dominate in Larger Glass Plants***

While the process of melting and refining is very similar throughout the industry, the type of furnaces used may vary considerably. In general, furnaces are classified as discontinuous or continuous.

#### **Discontinuous Furnaces**

Discontinuous furnaces are used in smaller glass melting operations, those on the order of less than five tons per day. Most of these furnaces are used by producers of small blown and pressed tableware, especially colored, crystal and other specialty glasses. They are operated for a short period of time and can usually go through the entire cycle of charging, melting, and removal of molten glass in a single day.

Discontinuous furnaces are either pot furnaces or day tanks. In a **pot furnace**, the glass is melted in a refractory pot inside the furnace, and the pot is externally heated. Pot furnaces may have single or multiple pots, and these may be open or closed. Open pots are open to the flames and gases generated by combustion of the fuel. Open pots have capacities ranging from 250-1000 pounds of glass, and must be operated with fuels that have minimum sulfur content. Few if any open pots are operated in the United States. Closed pots range in capacity from 250-2000 pounds of glass, and are used primarily for melting crystal, lead and colored glasses. Pot furnaces are generally operated to melt glass overnight and permit working of the glass during the day.

**Day tanks** are small units employing semi-manual operations, and the charging/melting/removal cycle is repeated daily. Day tanks are used for many types of specialty glass, and most commonly for opal, ruby, crystal, and soda-lime glasses. Melting times in these furnaces vary considerably. Soft opal or ruby can be melted in 8-10 hours, where soda-lime glass may take up to 24 hours. Automatic controls keep the melting temperature constant, and the glass melt must be sampled to determine when melting is complete.

#### **Continuous Furnaces**

Continuous furnaces are found in larger operations and are designed to be used continuously over a period of years. In the continuous furnace glass levels remain constant, with new batch materials constantly added as molten glass is removed.

Continuous furnaces can be fired by natural gas, electricity, or a combination of both. When both are used, the furnace is said to be fitted with “electric boost.” In natural gas furnaces, the gas is burned in the combustion space above the molten glass and the transfer of energy occurs through radiation and convection. When electricity is the energy source, electrical resistance is introduced using electrodes that are

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Detail shown.

## About Spectrum

### The Continuous Ribbon Process

During the 1920's, one of the most important technological advances in the history of sheet glass took place: the development of a production process called the "continuous ribbon." This new system took four separate phases of sheet glass production (raw material introduction, melting, sheet forming and annealing) and combined them into one continuous operation, making possible the production of large quantities of glass with very uniform and stable properties. Volume was boosted, costs were lowered, quality was improved, and the continuous ribbon became the heart of modern sheet glass production.

Fifty years later, in 1976, the continuous ribbon was successfully adapted for art glass production. Three Seattle glass lovers with backgrounds in engineering noticed the increasing and unsatisfied demand for art glass. They gambled that it was technologically possible and economically feasible to create multi-colored glass in a continuous ribbon system, integrating old-world methods with modern glass technology. Their success became Spectrum Glass Company.

In the Spectrum process, raw materials are introduced into a tank furnace, displacing existing molten glass and forcing it, stream-like, down a channel called the forehearth. At the end of the forehearth the red-hot liquid pours into a deeper pool, the stirring bay. Continuously moving, the glass flows from the stirring bay through a pair of water-cooled forming rolls, flattening into uniform thickness and becoming an endless ribbon of sheet glass. It is drawn directly into the annealing lehr, passing through a tunnel of 28 individual oven sections, annealing and cooling before emerging and being cut by hand into 48" lengths. This flow of glass from the primary furnace is either an end in itself (a smooth cathedral) or the base glass for the more complex products that Spectrum produces.

Multi-colored glasses are achieved in a fascinating way, using a process that distinguishes Spectrum from all other sheet glass manufacturers. The secondary glass colors are melted in smaller furnaces located on a platform near the forehearth channel. As the base glass flows down the forehearth, one or more secondary glasses are ladled by hand into the stream. Then, at the stirring bay, the different glasses are carefully stirred together by a skilled operator using a hand-held rod.

Of course, both the timing of the ladling and the stirring technique are critical to the end result, and vary for different products. Spectrum's

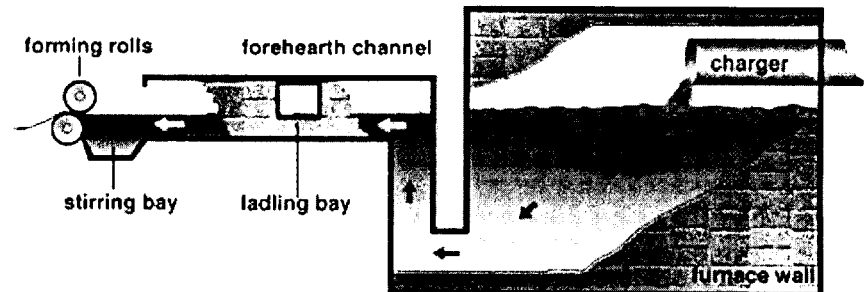
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## Virtual Tour

### Inside the Furnace

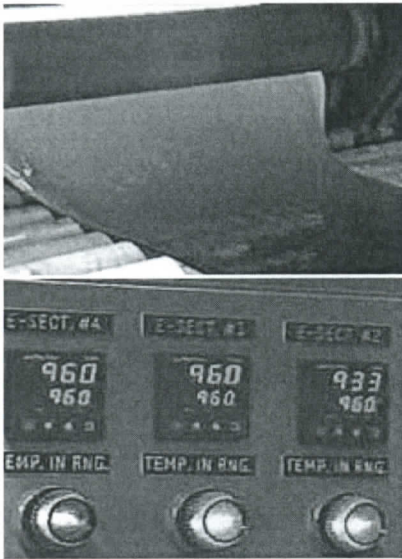
Raw materials from the canisters feed through the Charger into the Furnace, settling on top of glass which is already molten.

Batch entering the Furnace displaces glass which has already melted, forcing it down the Forehearth Channel toward the Sheet Forming Rolls. Glass in the Primary Furnace reaches temperatures up to 2700 degrees Fahrenheit.

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## Virtual Tour

### Forming Sheets

Downstream from the Stirring Bay, the glass flows between the two Forming Rolls creating a continuous ribbon of sheet glass.

From there the ribbon moves slowly through the Annealing Lehr, a tunnel of ovens that cools the glass gradually, relieving thermal stress.

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## Virtual Tour

### Cold End Cutting

The glass exits the Annealing Lehr and moves along into the "cold end" of the plant. All sheets of Spectrum are cut by hand to monitor cutability and insure that each is visually examined by trained personnel.

Throughout the production day glass is put through rigorous testing to insure consistent cutability and quality.

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Detail shown. Full image available in Gallery.

## Knowledge Base

### Frequently Asked Questions

#### Products

- What should I do differently when I use SilverCoats™?
- Why did you discontinue that product?
- Do you ever bring back discontinued products?
- Why are some of your products unavailable for extended periods?
- How do you decide on which new products to make?
- Why don't you make a transparent black?
- Can I get a custom color made?
- Can I get every color you make in any texture?
- Do you make glue chip?
- Can I order custom sheet sizes? Extra thick or thin glass?

#### Product Qualities

- What causes the comet-shaped marks on the surface of some of your opal glasses?
- Why do you call it T-glass?
- What's the best way to cut Waterglass®?
- Why does Baroque cut "differently" than your other glasses?
- Some Spectrum sheets aren't 24 inches wide ... why?
- Why are some Waterglass sheets narrower than 24 inches?
- Why does the Waterglass texture seem to vary somewhat from color to color?
- Is there a front & back side to the glass sheets? How can I tell which is which?
- Why do some products have more seeds than others?

#### Production

- How do you make Waterglass?
- How do you make Baroque?
- How do you make Iridescent Glass?
- How do you make Ripple Glass?
- How do you make Seedy Glass?
- How do you make Hammered, Granite, Ice Crystal, etc.?
- How are your Gold Pinks made?
- What do you mean by "Continuous" process?
- How do you actually get the color in the glass?

#### Other

- I bought a sample set awhile back, and it's never been updated like you promised ...
- How can I get my work published?
- Why can't I buy my glass directly from you?
- Do you give tours of the factory?
- Can I get back issues of THE SCORE?
- Can your glass be tempered?
- What do your stock numbers mean? Is there any rhyme or reason to them?
- Do you have patterns available of the glass work you feature on the site or in publications?
- Why don't you label your sheets?



## Products

### **What should I do differently when I use SilverCoats™?**

Mirror calls for a little extra care when used in stained glass projects, and SilverCoats are no different. You want to protect the silver coating from chipping during construction and from deterioration over time. Either avoid grinding or use a special mirror bit on your grinder (Mika ME-5F or ME-6F). If it's a copper-foil project, remove flux and patina as soon as possible. Then, remember to use a sealant. Your supplier stocks these inexpensive shellacs (Sprayway Mirror Edge Sealant is a popular brand). Follow the instructions, lightly spraying the edges and back surface of cut pieces. As with all mirrored glass, use a mirror mastic where adhesive is called for. These little precautions will assure that your SilverCoats stay looking brilliant in your projects.

### **Why did you discontinue that product?**

There are any number of reasons why we choose to discontinue a product. It is never a simple decision, and it's always more complex than just "slow sales" There's usually a compounding production-related factor, such that equipment or scheduling limitations, combined with poor demand for the product, lead us to choose to "discontinue" production.

### **Do you ever bring back discontinued products?**

Certainly. There have been many cases of products being reinstated to the standard line. It usually means we've solved the production issues that originally led to it's demise and feel demand is strong enough to warrant making it again.

### **Why are some of your products unavailable for extended periods?**

Normally it's due to our inability to accurately predict the future. The nature of our process requires us to run an extended color cycle. That is, the colors must be run in a set sequence, and it takes months to go through the cycle. So, when we make red, for example, we make enough to stock and sell for the entire length of the color cycle—until we get back to red again. Sounds simple enough, but the longer the cycle, the harder it is to accurately predict sales volumes.

At other times, our capacities have been so overburdened that we've chosen to skip certain products in the cycle in favor of others. Knowing that we're going to be out of something, we might choose to produce clear Waterglass® and skip orange. These are tough decisions, and they are extremely rare.

### **How do you decide on which new products to make?**

We listen. Our market research is as sophisticated as chatting with glass users on the phone, at trade shows, and so on. Have some ideas? Needs? Daydreams? Give us a call, or better yet, use your Email!

### **Why don't you make a transparent black?**

Black, by definition, is the absence of light. All light is absorbed. Anything that transmits light wouldn't be black anymore. We could make a very dark gray, but the darker it is, the *less light* it would transmit. Everything's a tradeoff.

### **Can I get a custom color made?**

Probably not, but let's talk about it. On things we have the ability to do, we will do, with a sensible minimum order. For example, customers can order an iridescent coating or a smooth texture where one isn't normally available. But that's quite different from an altogether custom color. Our response to that depends entirely on what the color is, how much you need and your time frame. You'll have to call with specifics to

get a better answer.

**Can I get every color you make in any texture?**

Not at this writing. Artique, Rough Rolled and Waterglass have broad color selections but generally we limit the production of rolled textures (Hammered, Granite, etc.) to colors that sell well enough to justify carrying the inventory.

**Do you make Glue Chip?**

No. Glue chip is a cold-glass process, that is, it's a treatment done to glass sheets long after they're produced. Many glue-chip manufacturers do use Spectrum glass, though. See the Dictionary for an explanation of how Glue Chip is made.

**Can I order custom sheet sizes?**

Extra thick or thin glass? At this writing, we can and often do produce, on special order, sheets of extended length, but not width. We regularly manufacture sheets measuring 24 x 60 to 24 x 72 inches or longer, custom order. Equipment limitations keep us from making sheets wider, however. Same goes for extra thick or extra thin glass, though we have some limited capabilities there. Call for more details.

**Product Qualities****What causes the comet-shaped marks on the surface of some of your opal glasses?**

We call them "seed tracks." In some particularly gaseous glass compositions, a bubble will form in the stirring bay ( the pool where glasses of different colors are stirred together). That bubble pops as it's drawn through the sheet-forming rolls, creating a "track" on the sheet surface. We make every effort to keep them to a minimum.

**Why do you call it "T-Glass?"**

When color changes are made in a continuous furnace, there is a transition that must take place between them. Example: In transition from blue to green, various hues of turquoise and teal are created inadvertently. Years ago, we called this "transition glass," or "T-Glass." As time went by, "T-Glass" came to refer to any glass product that falls outside our standard tolerance due to variance in color, texture, mix characteristics, or light transmission.

**What's the best way to cut Waterglass®?**

Score the glass on the back side (the flatter side) to ensure an even, uniform score. Don't forget to reverse your pattern if you want the wavy side out in the finished project.

**Why does Baroque cut "differently" than your other glasses?**

Baroque is very unique. In it we mix together two or more glasses of intentionally mis-matched compositions. The glasses, of slightly different expansions, "resist" being mixed together and don't homogenize easily. Thus, the characteristic reamy pattern and high-contrast mixes. Due to the nature of Baroque, the sheets have slightly more internal stress than other Spectrum products. Which means greater care is in order when cutting.

**Some Spectrum sheets aren't 24 inches wide ... why?**

Sometimes the glass runs narrow, simple as that. Rather than throw it away, we put a few extra sheets in the case to make up any lost square footage to the distributor. Distributors vary in their methods of selling Spectrum sheets that are less than 24 inches wide.

**Why are most Waterglass sheets narrower than 24 inches?**

The Waterglass® texture is created by stretching the molten glass ribbon as



it exits the sheet-forming rolls. Grasp two ends of anything with some give and stretch it. Gets narrower, right? There 'ya go.

**Why does the Waterglass texture seem to vary somewhat from color to color?**

Different colors, even different densities of the same color, have different heat-retention properties, and thus, different viscosities at the same stage in the sheet-forming process. These properties directly affect the texture that results when the hot glass ribbons "stretched." We make adjustments aimed at consistency of texture, but you will see some differences on close examination.

**Is there a front & back side to the glass sheets?**

Absolutely! How can I tell which is which? In some products it's obvious, in others, less so. Generally speaking, the shinier side is the top or front side of the sheet. Rolled textures are always textured on the back side of the sheet.

**Why do some products have more seeds than others?**

In glasses that aren't intentionally seedy, the seed count and size varies with the nature of the glass composition. Some glasses, notably ambers, champagnes and purples, are naturally more gaseous in nature than others. Gas in the glass equals bubbles in the sheet.

**Production****How do you make Waterglass®?**

It is produced by over-stretching the glass ribbon as it emerges from the Forming Rolls, while it is still hot enough to shape. This stretching forms the natural "rippy" Waterglass surface.

**How do you make Baroque?**

Baroque is a "reamy" glass, whose texture is produced by stirring together two glasses of carefully mismatched compositions. See Cutting Baroque.

**How do you make Iridescent Glass?**

Immediately downstream from the sheet forming rolls, the hot glass is sprayed with a liquid metallic crystal that bonds to the surface, creating the colorful, shimmering reflections.

**How do you make Ripple Glass?**

Spectrum Ripple is also a natural texture. We operate the top and bottom forming rolls at different speeds, which sets up a 'jumping' tension between them, causing the dynamic ripple texture to form.

**How do you make Seedy Glass?**

Compressed air is forced into the molten stream in the forehearth channel. As you might guess, this makes the glass 'bubbly.'

**How do you make Hammered, Granite, Ice Crystal, etc.?**

These are rolled textures. Their patterns are embossed on the bottom forming roll, which textures the sheet as it passes through.

**How are your Gold Pinks made?**

We use a pink glass frit made from gold oxide. Frits are color-concentrated glass chips that can be sprinkled into the forehearth and melted right in the molten stream.

**What do you mean by "Continuous" process?**

The Spectrum process combines the four principle phases of sheet glass production (raw material introduction, melting, sheet forming and annealing) into one continuous process. Base glasses are melted in continuous

furnaces, which are always full of molten glass. Raw materials introduced into the furnaces push molten glass out, forcing it, stream-like, down the forehearth channel, past the ladling bay, where secondary glasses are added by hand, and on to the stirring bay, where the combined glasses are hand-stirred together. Continuously moving, the glass then flows between the sheet-forming rolls and into the annealing tunnel. It's the only process of its kind in the world. Read more.

#### **How do you actually get the color in the glass?**

Color is created as part of the basic raw materials. Virtually any metallic oxide creates color in glass. Some of the most common are cobalt (blue), copper (blues & greens), manganese (purples), sulfur (ambers) selenium (reds & oranges), cadmium (yellows), chrome (green), fluorine (white opal) and nickel (gray).

#### **Other**

##### **I bought a sample set awhile back, and it's never been updated like you promised ...**

Ahem.... No, really, we make every effort to notify all registered sample set owners for every Sample Set Update. We publish the Update availability in our quarterly newsletter, The SCORE, and here, in our web site. You become a registered owner by returning the postage-paid card that came with your set. Updates normally happen in September, though we've been known to do interim updates during particularly prolific new-product years. Need to bring your Sample Set up-to-date? Refer to Samples for complete information.

##### **How can I get my work published?**

We'd love to see your work, and will consider it for publication in The SCORE, other publications, or here in our web site. We've even been known to use unsolicited work for posters and Spectrum T-shirts, or in our trade show display. Remember, though, get good photographs. We see a lot more bad photos of good work than the opposite, and simply can not use them. Incidentally, we also keep photo albums of art work using Spectrum in our offices, and share them with visitors and the like. If you'd like to be represented, just send the shots!

##### **Why can't I buy my glass directly from you?**

We make a lot of glass, and have to depend on a distribution system to buy in bulk, break down that bulk, and move it to retailers who take the same job a step further. Every step in the chain serves a critical purpose and meets a critical need. We protect those companies (distributors and retailers) by not selling directly to their customers, because we need them—to accomplish effective, wide-scale distribution of our products.

##### **Do you give tours of the factory?**

Every day, no charge. Actually, weekdays only, 8-4. We prefer you call in advance to let us know you're coming, and there are a few guidelines we like to communicate to you in advance (age restrictions, etc.) But the tours are really cool, and everyone enjoys them. Please come -- or take our Virtual Tour.

##### **Can I get back issues of THE SCORE?**

Sorry, we don't keep back issues. Here on the web, though, we intend to make past patterns available, as well articles of wide interest. If there's a particular item you need (pattern, article copy) and you don't find it here, contact us—we'll do what we can.

##### **Can your glass be tempered?**

Sure, but it might break in the process. Tempering is the process of putting the stress that we've so carefully annealed out of the glass, back into it. Successful tempering depends on the particular glass's ability to stand up to



induced internal stresses. So, fairly simple glasses will temper fairly well (smooth cathedrals) and more complex ones may give you major headaches (Baroque). All you can do is try it on a small scale, experimenting with the tempering process, to find a set of time-temperature relationships that give you acceptable results on the given glass you're trying to temper. Acceptable results would be a rate of loss (breakage) in the tempering process that you could live with. The trial & error process will require close cooperation of the tempering facility you're working with.

Bottom line: art glass of any kind will not temper as dependably (low breakage rate) as float glass, because it's not near as "perfect," or flawless. But it can be done, and is done, fairly frequently. Consider lamination, too, when safety glass requirements need to be met.

**What do your stock numbers mean?**

Is there any rhyme or reason to them? We'll refer you to our explanation of our system: [Classification](#).

**Do you have patterns available of the glass work you feature on the site or in publications?**

We have obtained permission to use the images as we have. You need to do so also. Please contact the artist/studio that produced the work.

**Why don't you label your sheets?**

Good question. There's really only one good reason: we sell to quite a few large-scale manufacturing firms. These companies are real producers, and any added step in their production process costs them time and money. Labeled sheets would mean them taking the time to remove each label, and they are decidedly against it. Segregating our production between labeled & unlabeled, to keep manufacturers from getting labeled product opens up a can of logistical worms that we don't want to touch. One of these days we may find the perfect compromise, but until then....

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